

Targeting technologies

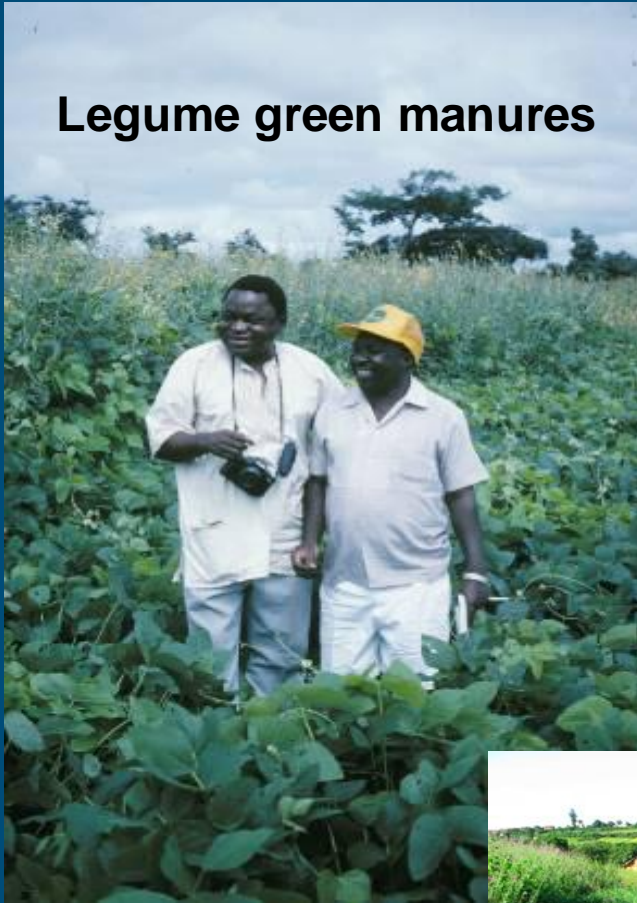
- from fields to farms and farming systems
- from silver bullets to 'best fits'

Ken Giller

Plant Production Systems,
Wageningen University,
The Netherlands

Potential solutions - Nitrogen fixing legumes

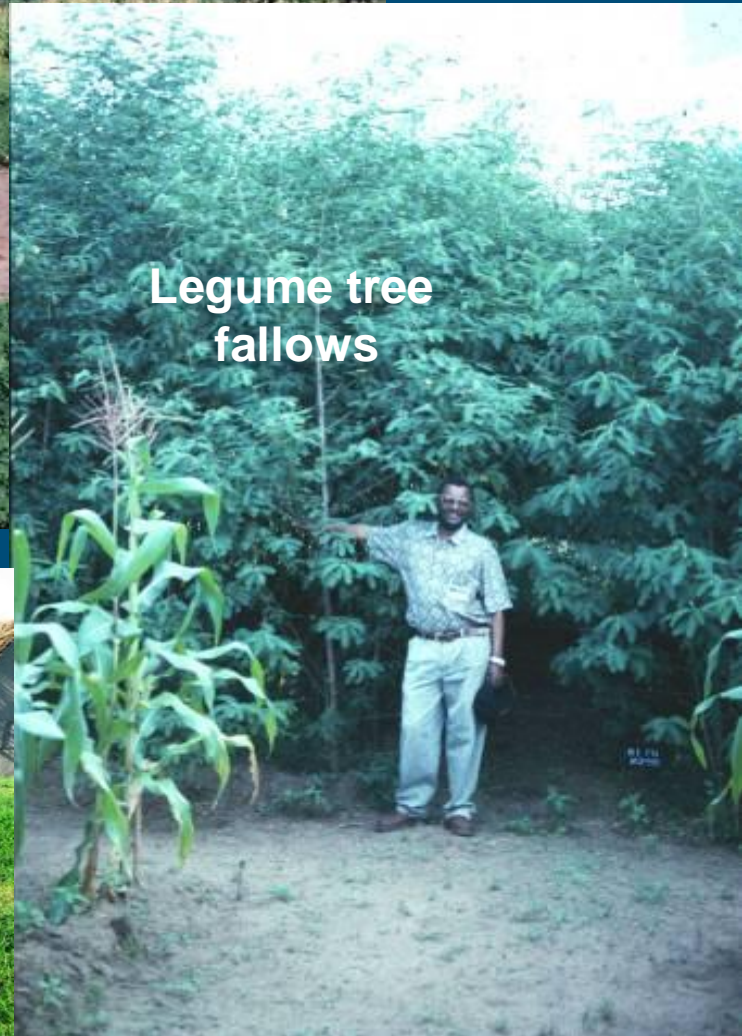
Legume green manures



Grain legumes



Legume tree fallows



Legume forages



Green manures on smallholder farms

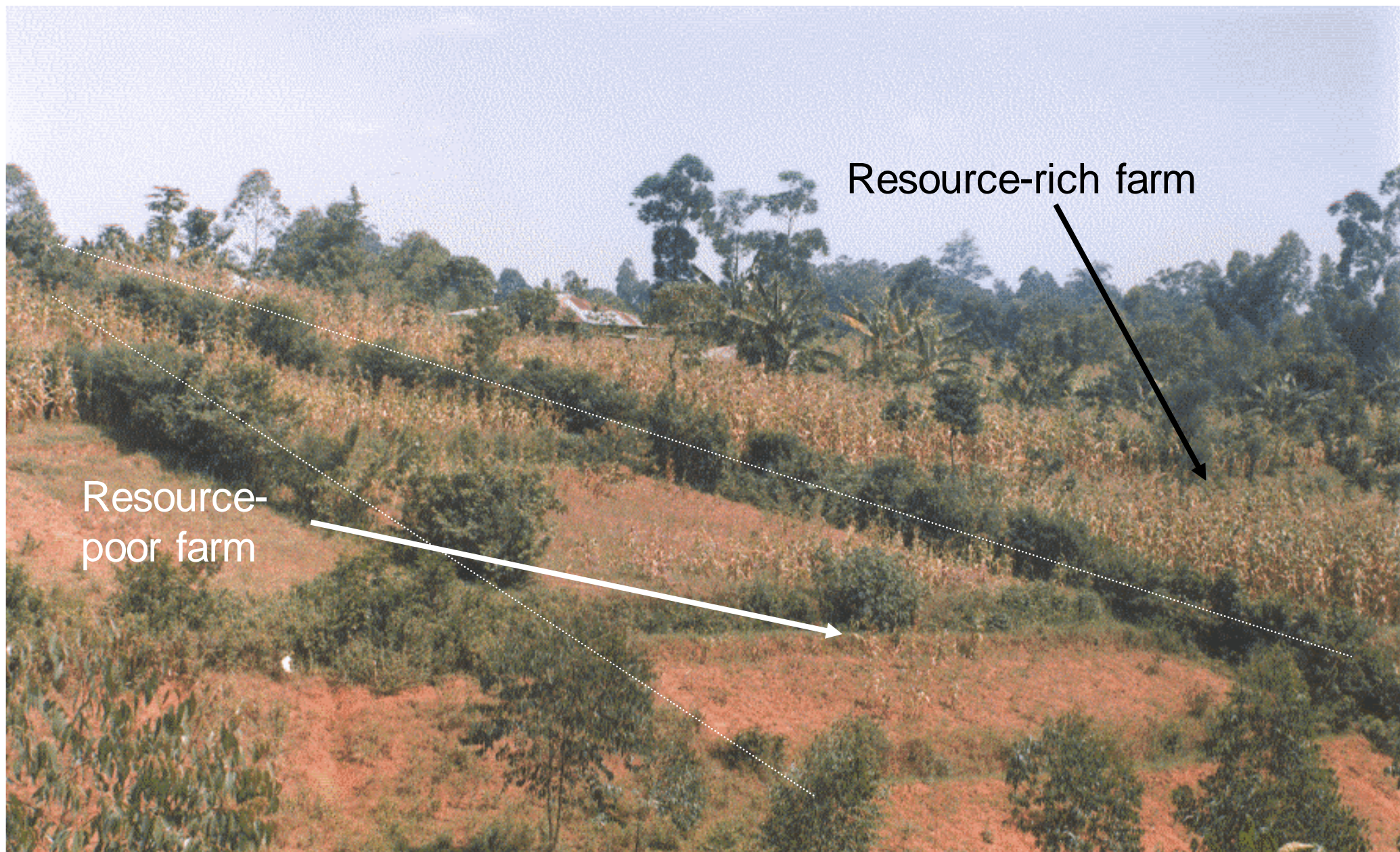
...there are no silver bullets....



Soil fertility gradients



Farm(er)s are not all the same!



NUANCES - Nutrient **U**se in **AN**imal and Cropping systems – **E**fficiency and **S**cales

A framework for analysis of trade-offs in African smallholder farming systems

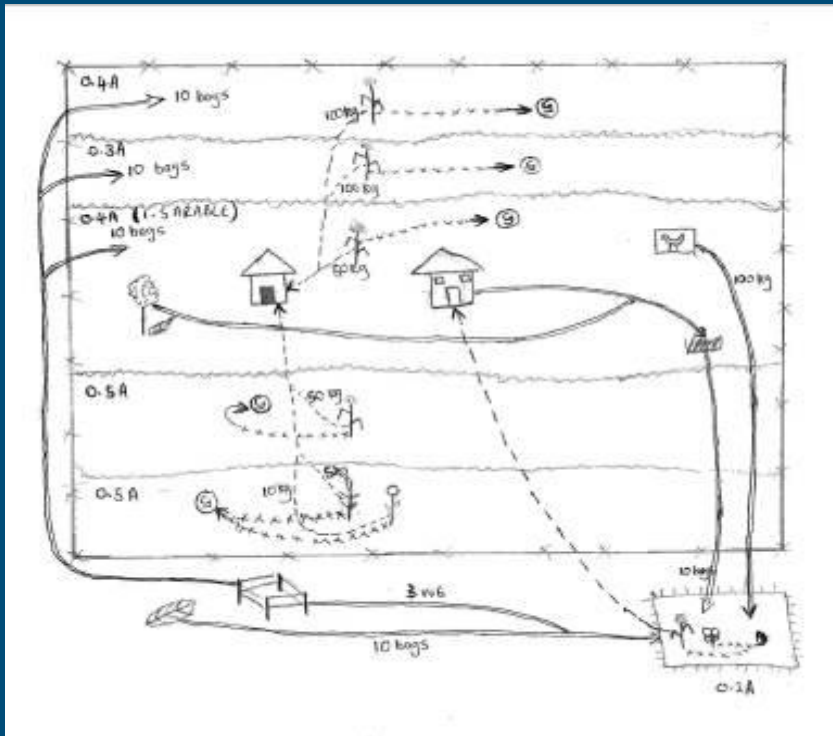
Resource flow mapping of smallholdings

Farmer Martha Murewa, Zimbabwe

Manages 6 fields (0.9 ha)

Labour available - 1 full time
1 chicken

Earns manure for homegarden

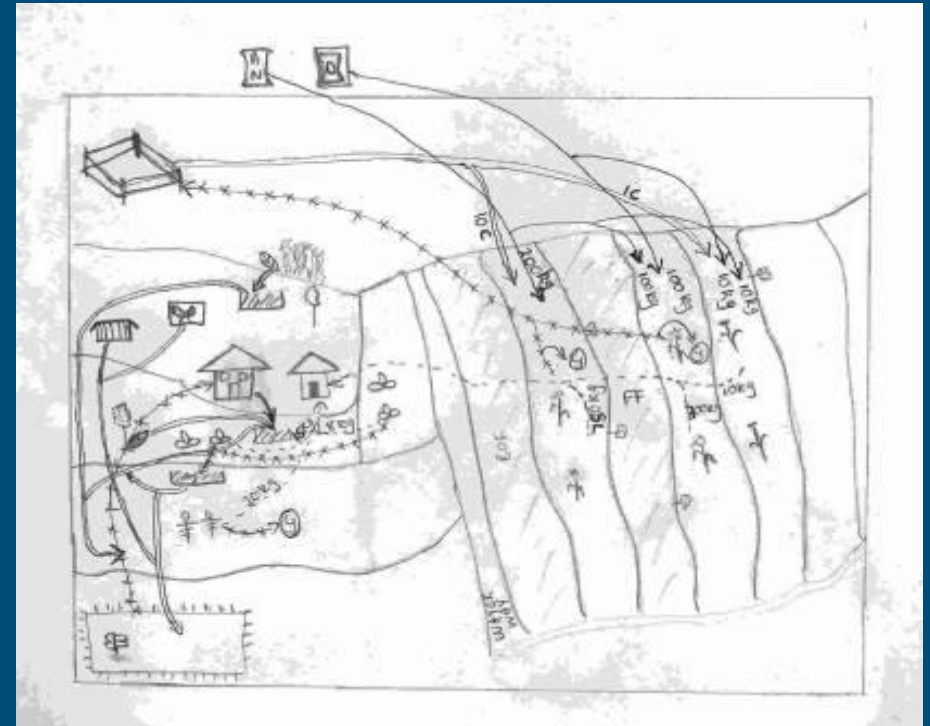


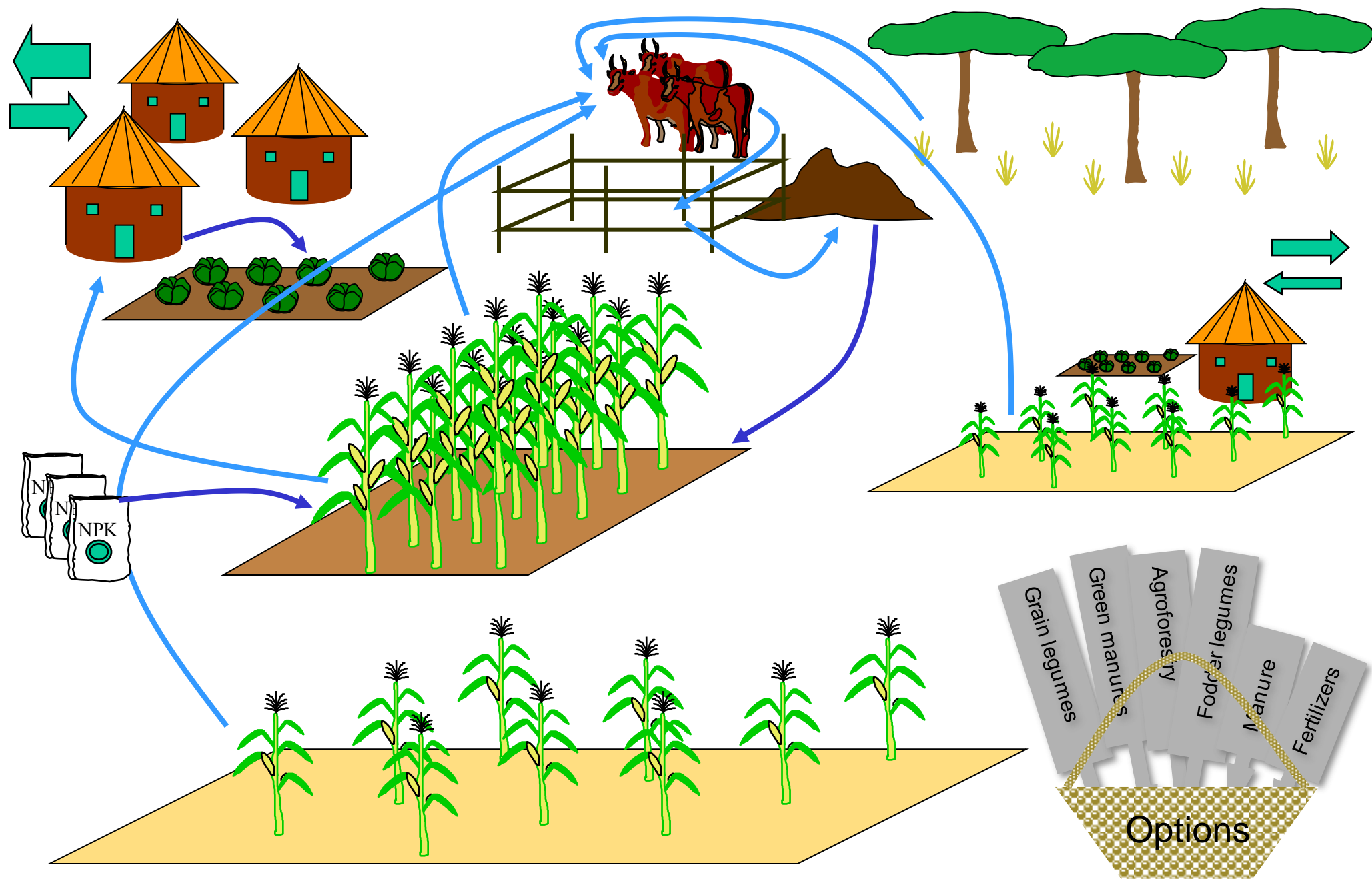
Farmer Thomas Murewa, Zimbabwe

Manages 4 fields (3.3 ha)

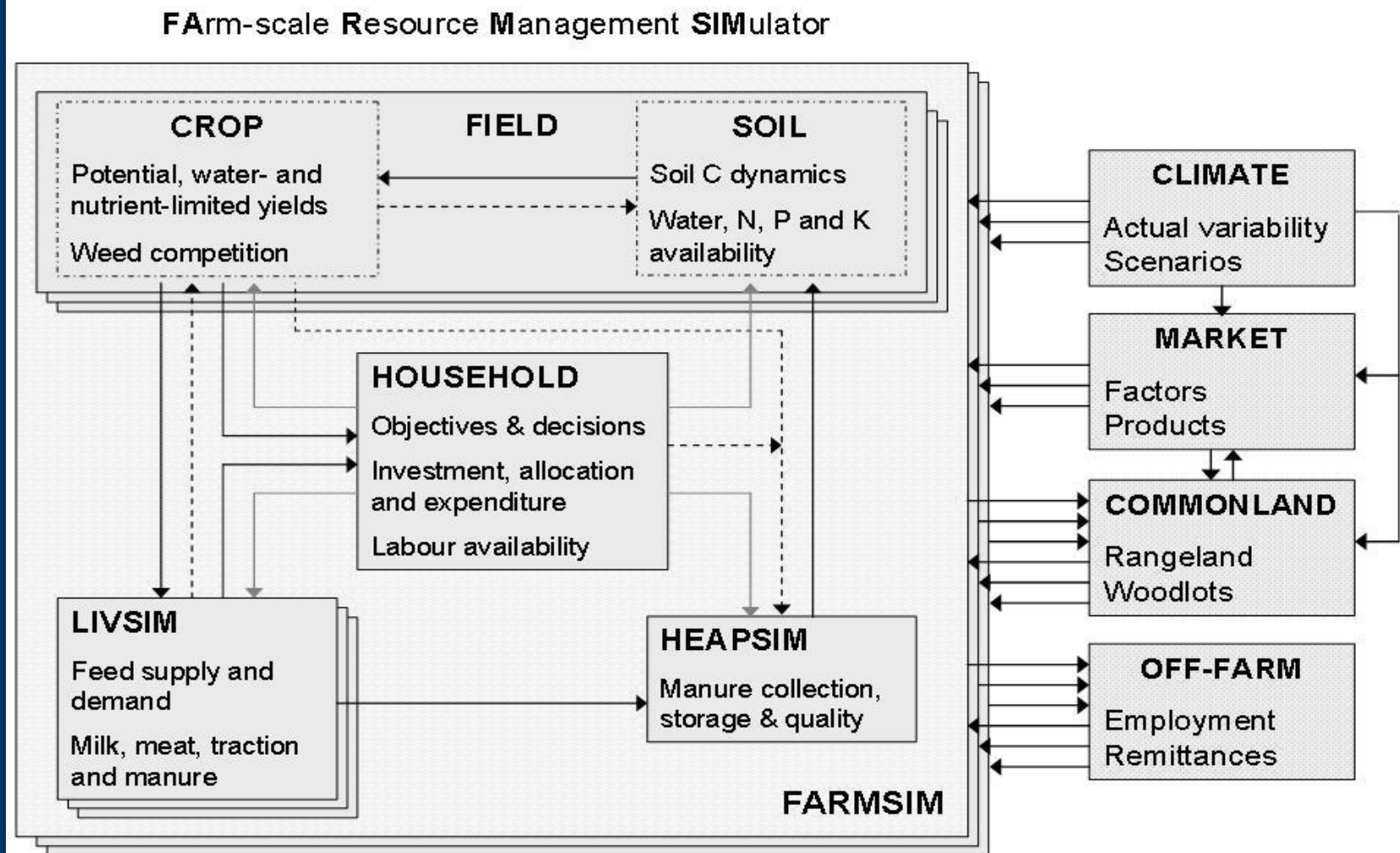
Labour available - 3 full time
11 cattle, 2 goats, 6 chickens

Uses manure and fertilizers

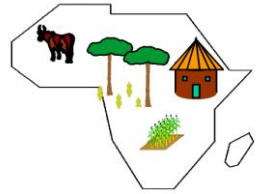




NUANCES-FARMSIM: farm-scale modelling approach



Hierarchies: Farm the focal point



Rainfall

400 mm



2000 mm

Cereals

Cereals +

Bananas

Forest/crop



Locations (8)

Comparison within

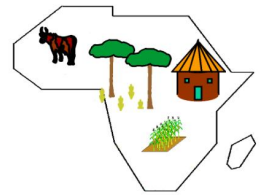


Rich

Poor

Comparison between

Typology of farms



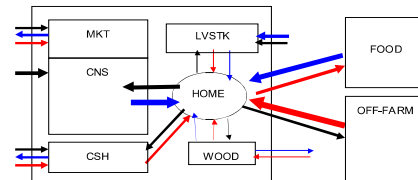
Family
composition

Resource
endowment

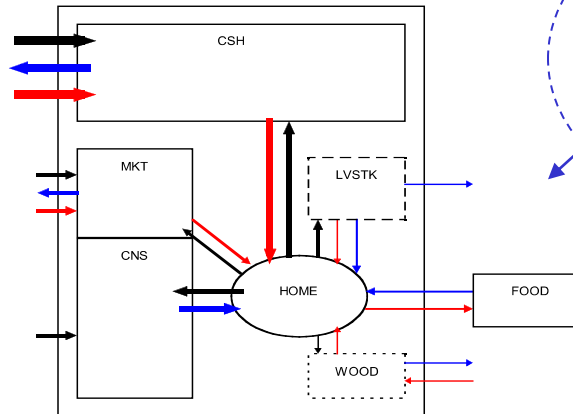
Production
orientation

Site-specific
factors

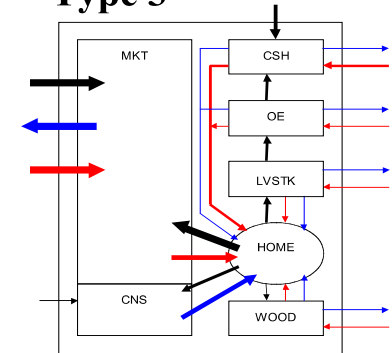
Type 1



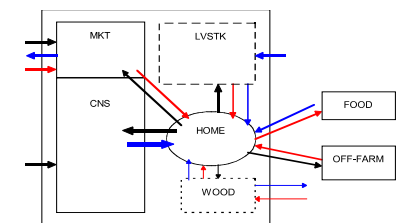
Type 2



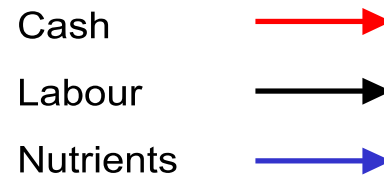
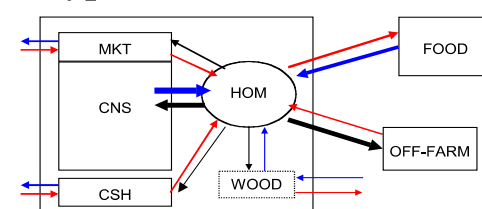
Type 3



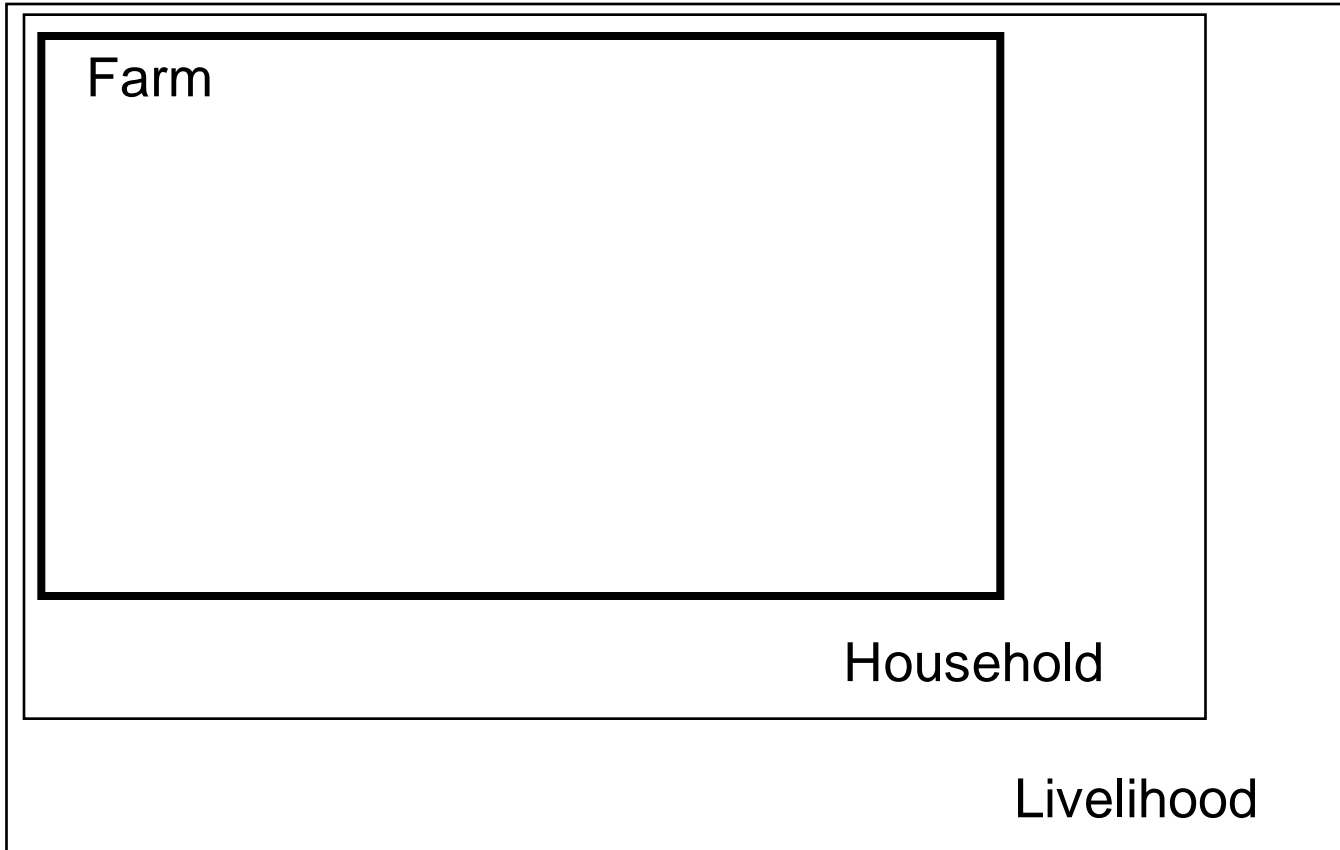
Type 4



Type 5



AfricaNUANCES - focused at livelihood scale



Household includes members who live and eat together at the farm but work outside

Livelihood includes members who send remittances back to the farm



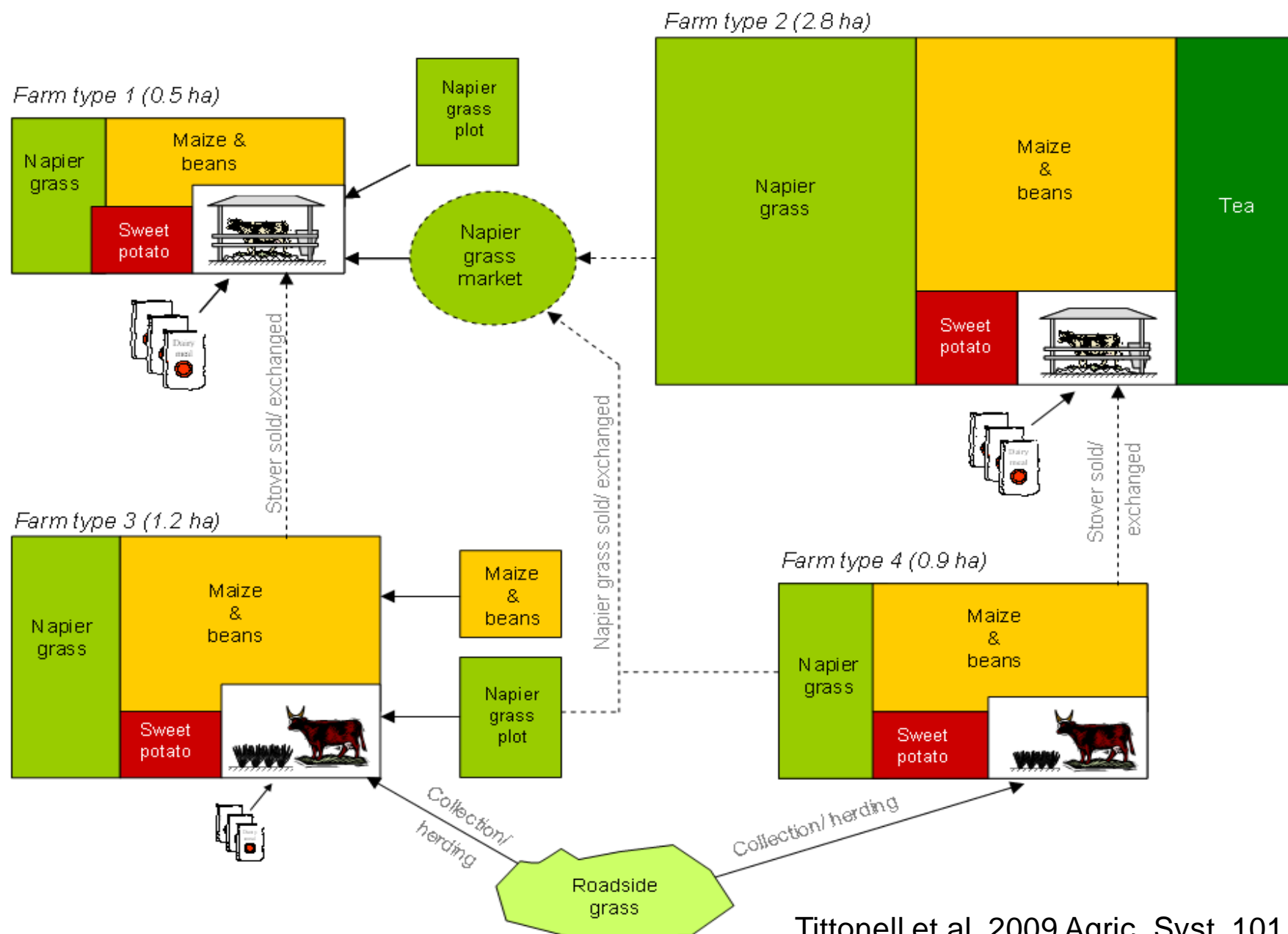


Farm management

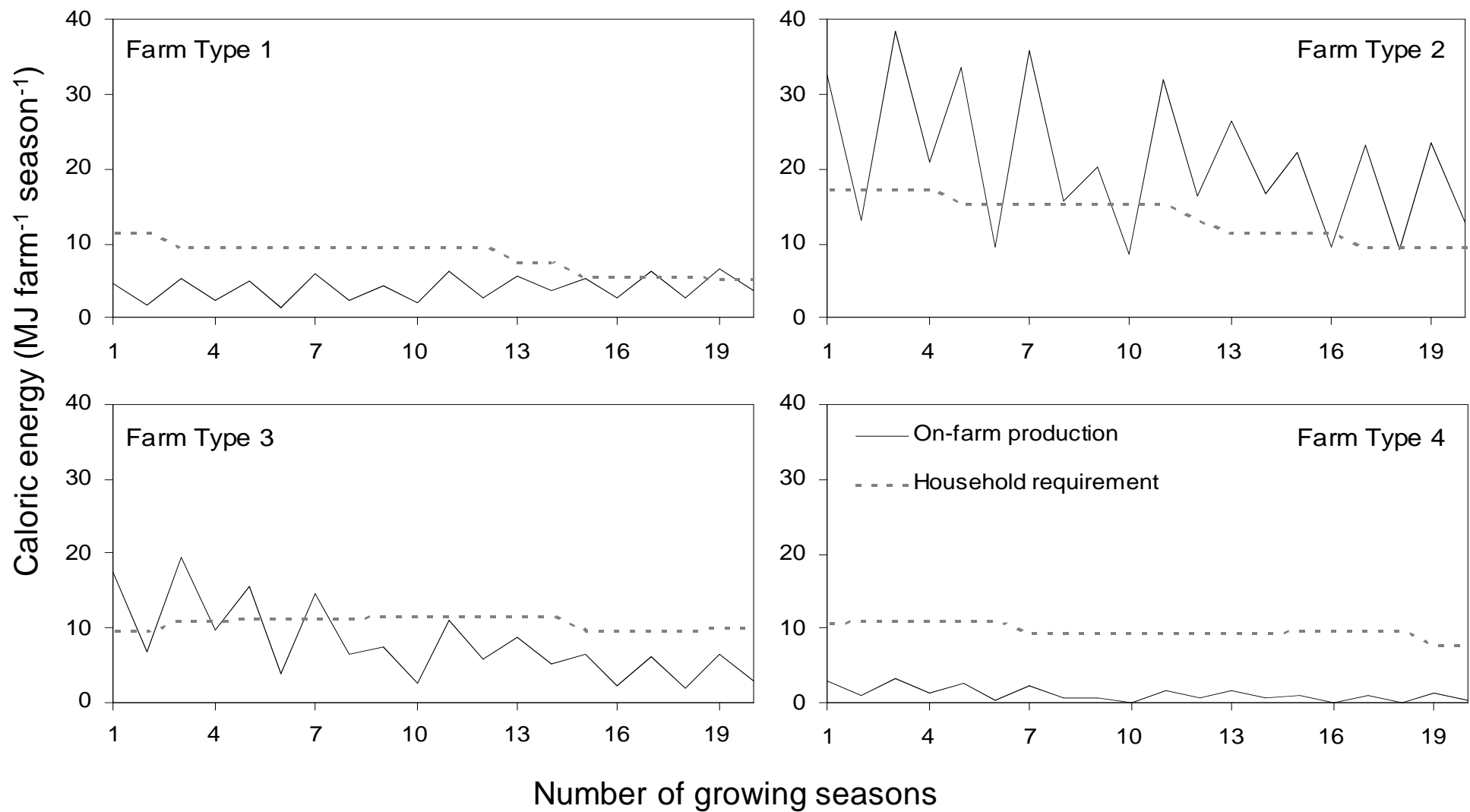
Distinguish three time scales for decision making:

- Strategic
 - « long-term: organisation in relation to endowments (land, labour, capital, production orientation, rotations)
- Tactical
 - « medium-term (production cycle of one crop): selection of production methods given the farm organisation
- Operational
 - « short-term: day-to-day management in relation to weather, crop development etc.

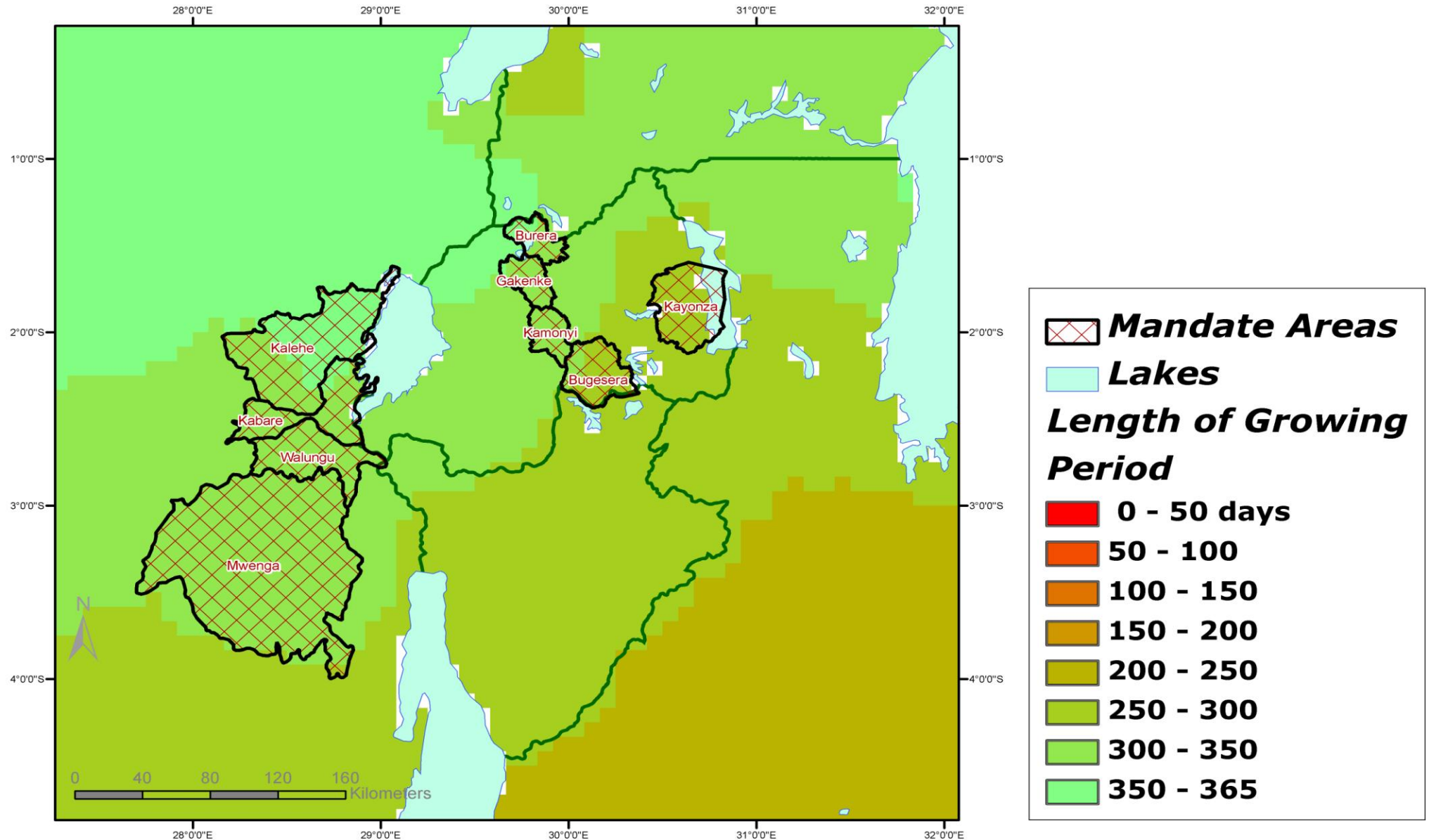
Smallholder livestock farms in western Kenya



FARMSIM – impacts on household food self sufficiency

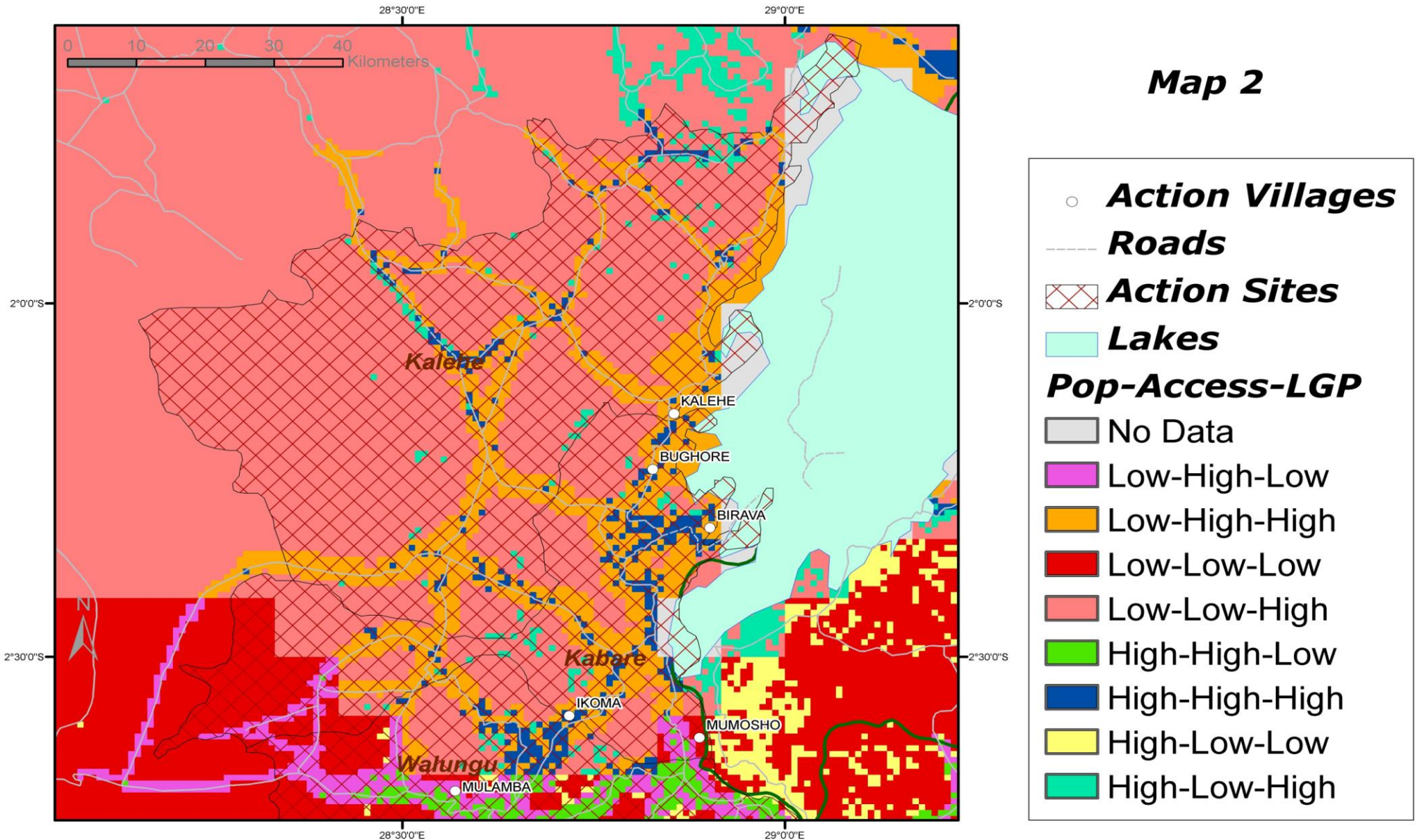


Rwanda and DRC Mandate Areas: Length of Growing Period



Rwanda and DRC Action Sites: Development Domains

Map 2



control



+Pfert



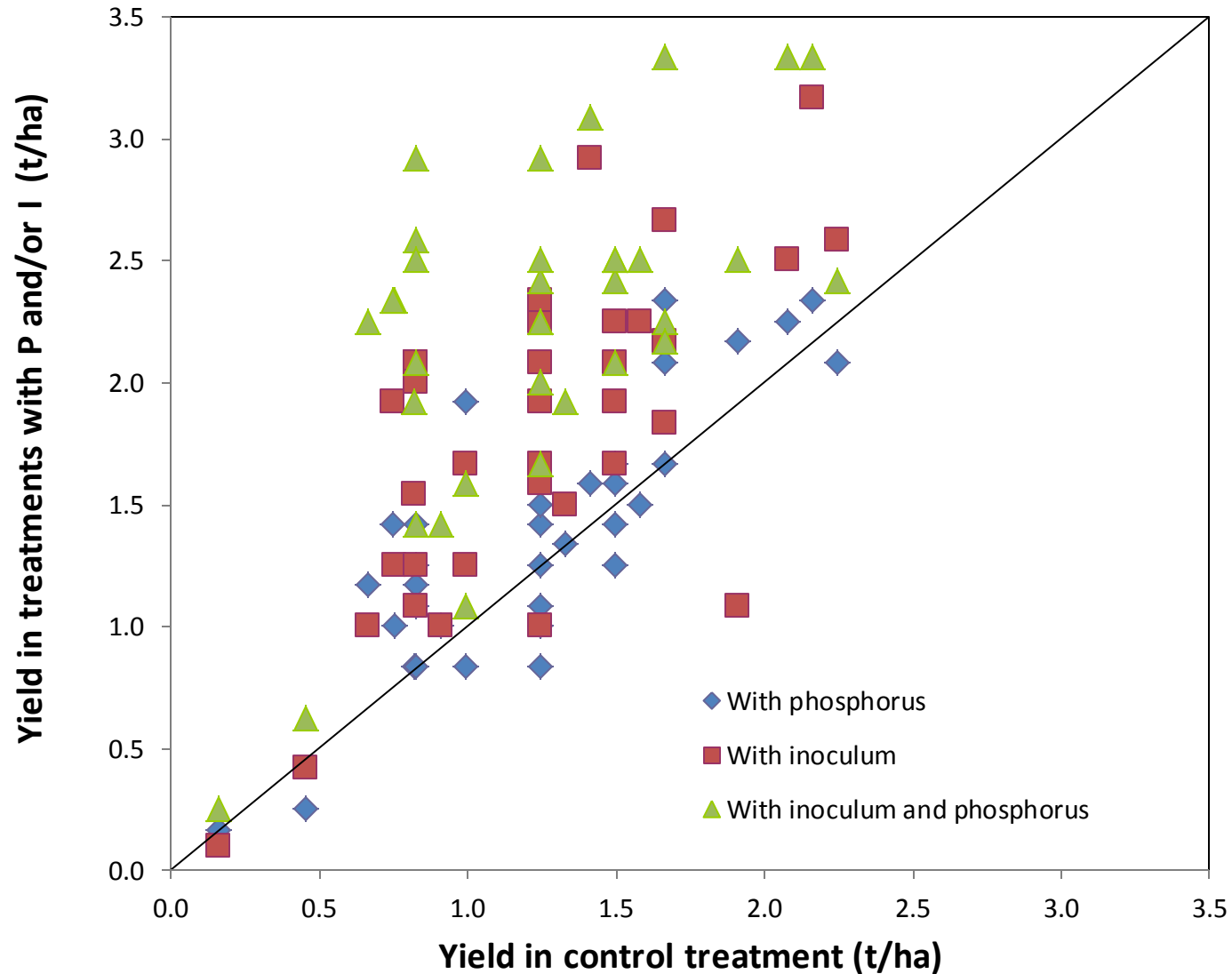
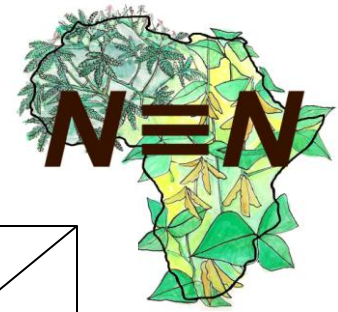
+ino



+Pfert+ino



Response to P and inoculation with soybean in DRC



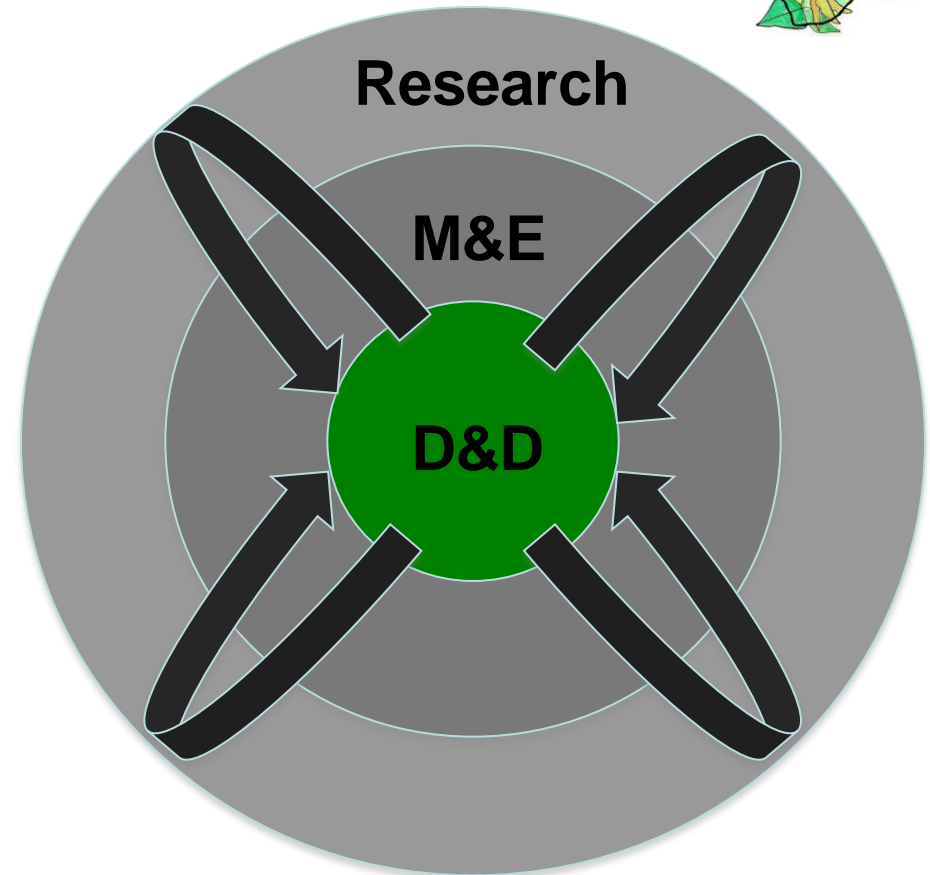


Potassium deficiency? – in plots without KCl

N₂Africa is a development to research project

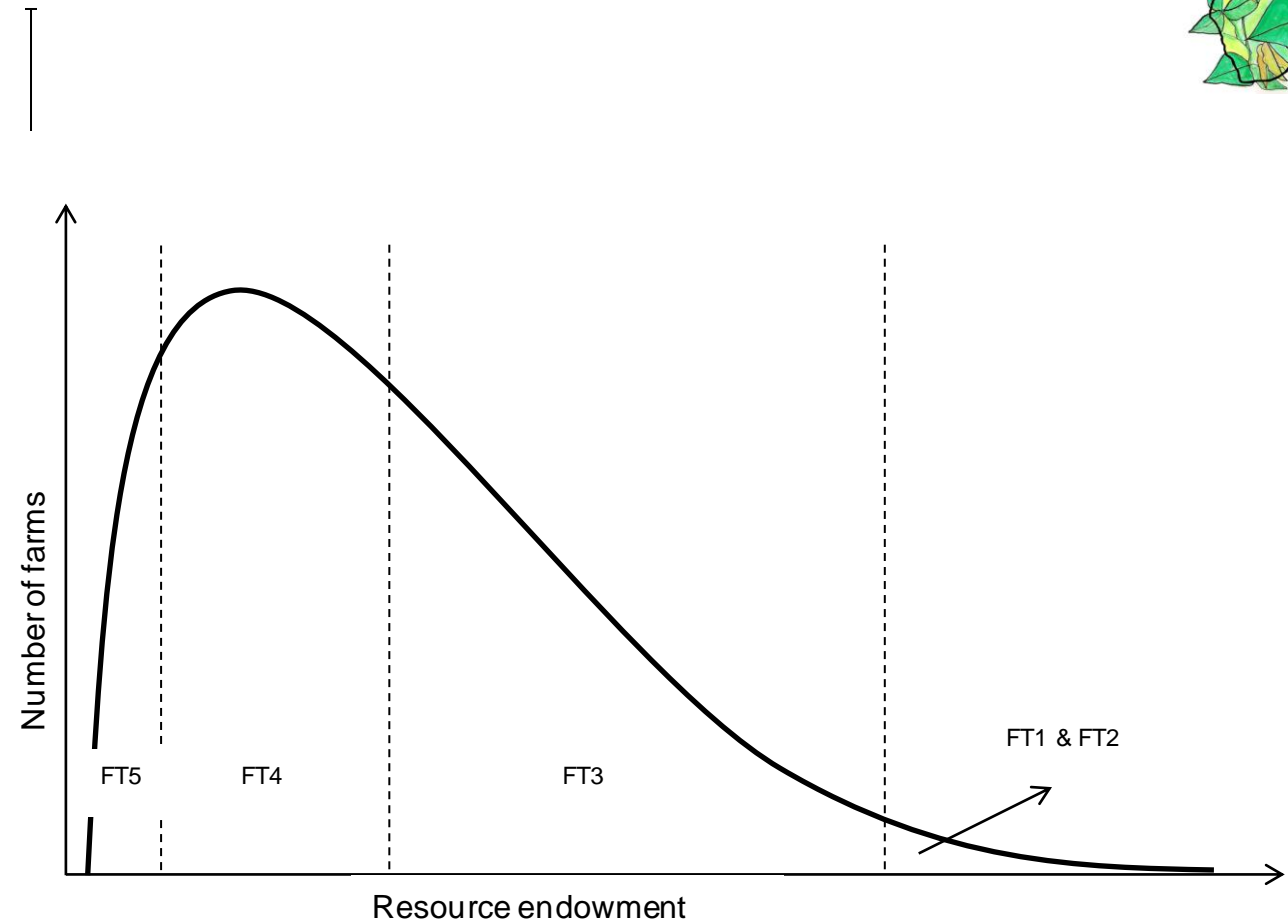
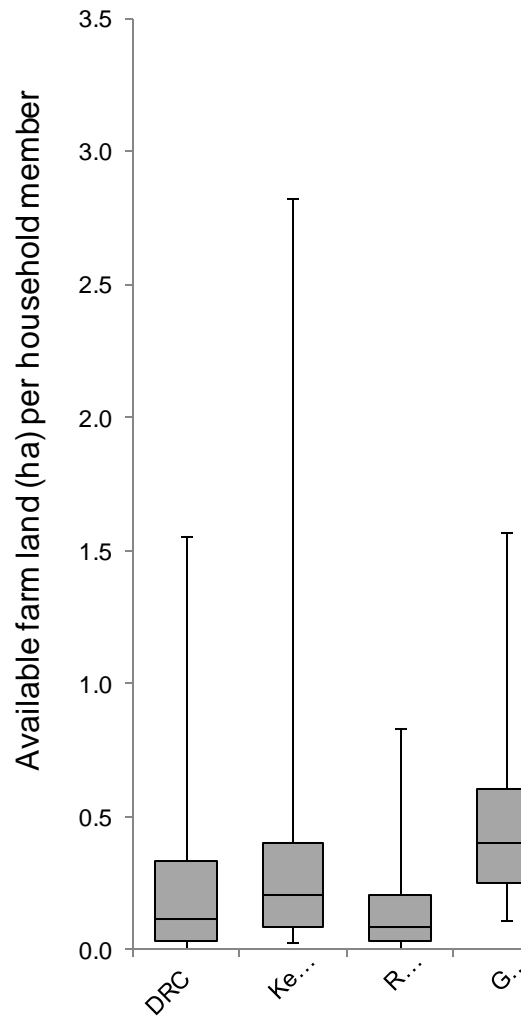


- Dissemination and development are the core
- M&E is provides the learning
- Research analyses and feeds back



Putting nitrogen fixation to work for smallholder farmers in Africa

Guided by farming systems analysis



Putting nitrogen fixation to work for smallholder farmers in Africa

Conclusions



1. Need better *ex ante* methods for advising policy and development agencies
2. Typologies of farming systems, farms and fields can help in targeting
3. Typologies can be based on a few simple criteria (land size, livestock ownership, hiring labour, hiring out labour, salaried income/pension)
4. Participatory approaches could lead to “lock in”
5. The classification needs to suit the purpose...



For updates see

www.N2Africa.org

Lots of video resource materials

N₂Africa Podcaster - Monthly Newsletter

Giller et al. (2011) Communicating complexity: Integrated assessment of trade-offs concerning soil fertility management within African farming systems to support innovation and development. *Agricultural Systems*, 104, 191-203.

Putting nitrogen fixation to work for smallholder farmers in Africa